DOCUMENT RESUME

ED 300 391 TM 012 228

AUTHOR Marsh, Herbert W.; Richards, Gary E.
TITLE The Tennessee Self Concept Scale: Reliability, Internal Structure, and Construct Validity.
PUB DATE 6 Jun 87
NOTE 39p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Adults; *Construct Validity; Discriminant Analysis; *Factor Analysis; Foreign Countries; Multitrait Multimethod Techniques; *Psychometrics; *Self Concept; *Test Reliability
IDENTIFIERS Australians; *Confirmatory Factor Analysis; Convergent Validation; Outward Bound; *Tennessee Self Concept Scale

ABSTRACT

The construct validity of responses to the Tennessee Self Concept Scale (TSCS) was evaluated in two sets of analyses. First, exploratory and confirmatory factor analyses, and an analysis of variance model adapted from multitrait-multimethod (MTMM) research, were used to examine the internal structure of the TSCS responses. Second, MTMM analyses were adapted to examine the convergent and discriminant validity of TSCS responses in relation to responses to the Self Description Questionnaire III and to the multidimensional self-concept ratings inferred by external observers. The subjects were 343 participants (aged from 16 to 37 years) in one of 9 Outward Bound courses offered in 1985 or 1986 at the University of Sydney (Australia). One-third of the subjects were full-time students, and most of the others were employed full-time during the year prior to the course. Across all analyses there was consistent support for TSCS family, social, and physical scales, but less consistent support for other TSCS scales. Eight tables are included and a list of 58 references is appended. (Author/TJH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED300391

The Tennessee Self Concept Scale: Reliability, Internal Structure, and Construct Validity

Herbert W. Marsh, University of Sydney, Australia
Gary E. Richards, Australian Outward Bound School

6 June, 1987

Running Head: Tennesse Self Concept Scale

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

HERBERT W. MARSH

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

TM 012 228

BEST COPY AVAILABLE

The Tennessee Self Concept Scale:
Reliability, Internal Structure, and Construct Validity

ABSTRACT

The construct validity of responses to the Tennessee Self Concept Scale (TSCS) was evaluated in two sets of analyses. First, exploratory and confirmatory factor analyses, and an ANOVA model adapted from multitrait-multimethod (MTMM) research, were used to examine the internal structure of TSCS responses. Second, MTMM analyses were adapted to examine the convergent and discriminant validity of TSCS responses in relation to responses to the Self Description Questionnaire (SDQ) III and to the multidimensional self-concept ratings inferred by external observers. Across all analyses there was consistent support for the TSCS Family, Social, and Physical scales, but less consistent support for other TSCS scales. Implications of further research and for the use of the TSCS were discussed.

The Tennessee Self Concept Scale:
Reliability, Internal Structure, and Construct Validity

Historically, self-concept research has emphasized a general or total self-concept. Although some researchers from the time of William James have posited self-concept to be multidimensional, there was limited empirical support for the assumption (Coopersmith, 1967; Marsh & Smith, 1982; Marx & Winne, 1978; Shavelson, Hubner & Stanton, 1976; Wylie, 1974) prior to the 1980s. Whereas numerous factor analytic studies reported multiple factors, these factors were typically difficult to interpret, unreplicable, or not clearly related to the scales that an instrument was intended to measure. Reviewers were particularly critical of the poor quality of self-concept instruments (e.g., Wylie, 1974). In dramatic contrast, more recent empirical research (Byrne, 1984; Byrne & Shavelson, 1986; Dusek & Flaherty, 1981; Fleming & Courtney, 1984; Harter, 1982; Marsh, Barnes & Hocevar, 1985; Marsh & Hocevar, 1985; Marsh & Shavelson, 1985; Soares & Soares, 1982) has found clear support for the multidimensionality of self-concept. The difference is apparently due to changes in the design of self-concept instruments. Early instruments tended to consist of a hodge-podge of self-related items and exploratory factor analysis was used to search for the salient factors. Current instruments are typically designed to measure a priori factors that are at least implicitly based on theory, and factor analysis is used to refine and confirm these a priori factors.

The Tennessee Self Concept Scale (TSCS)

The Design of the TSCS.

The Tennessee Self Concept Scale (TSCS; Fitts, 1965), unlike most early instruments, emphasized the multidimensionality of self and was specifically designed to measure a priori factors. Fitts noted the need for a scale that was "multidimensional in its description of self-concept" (1965, p. 1) and developed the TSCS to meet this need. In this respect, the TSCS was a forerunner of more recently developed instruments.

Fitts used a 5 (external frame of reference; EXT) x 3 (internal frame of reference; INT) x 2 (positively vs. negatively worded items; PN) facet design in the development of the TSCS. The 5 EXT scales -- Physical self, Moral self, Personal self, Family self, and Social self -- are like the traits posited on many subsequent instruments (e.g., Marsh, Barnes & Hocevar, 1985). In Fitt's schema each of these self-concept traits could be manifested in relation to three internal frames of reference -- Identity

TM 012 228

(what I am), self-Satisfaction (how I feel about myself), and Behavior (what I do or how I act). Identity is the private, internal self-concept, whereas Behavior is the manifestation of self that is observable to others. Self-Satisfaction reflects an actual-ideal discrepancy. Thus Fitts notes that a person can have high scores on the Identity and Behavior scales but still have a low Satisfaction score "because of very high standards and expectations of himself" (1965, p. 2). The third facet in the design of the TSCS, PN, provided a control for various response biases although Fitts also suggested that differences in responses to positively and negatively worded items may represent psychological conflict (1965, p. 4). Each of the 90 TSCS items can be classified into one of 3x5=15 cells representing all combinations of the EXT and INT facets, or one of 30 cells if positively and negatively worded items are considered separately. Whereas a wide variety of scores have been proposed, Fitts' discussion and most subsequent research has emphasized the 5 EXT scales, the 3 INT scales, and a total score. The construct validity of responses to the TSCS in relation to the 3x5 design and the 3x5x2 design is the focus of the present investigation.

Reviews of the TSCS.

The TSCS continues to be one of the most popular personality instruments and, perhaps, the most widely used multidimensional self-concept instrument. Bolton (1976) noted that it ranked 14th in total number of references for all personality tests during the 1969-71 triennium and was one of the few tests to increase its rank-order by 30 points or more between the last two publications of Buros' Personality Tests and Reviews. In the most recent Mental Measurements Yearbook (Mitchell, 1985, p. xviii), the TSCS ranked 18th in total number of references compared to all tests, 12th among personality tests, and 1st among self-concept instruments (followed by the Piers-Harris Childrens' Self Concept Scale and the Coopersmith Self Esteem Inventories). More than 800 TSCS references are listed in the various Buros publications, and many more references are contained in a supplement to the Test Manual. Despite this tremendous popularity, reviews of the TSCS differ dramatically. In his extensive review of self-concept instruments, Crandall (1972) rank-ordered instruments in terms of "perceived overall quality" and selected the TSCS as the best of existing instruments. Bentler's 1972 review of the TSCS indicated that "the various content areas are well conceived" (p. 366) but also noted "the virtually complete absence of information regarding the internal structure of the scale" (p. 367) that is surprising for a multidimensional self-concept instrument. In a particularly

negative review, Wylie (1974) concluded that "no justification can be offered, either a priori analysis in terms of acceptable methodological criteria or from a survey of empirical results to justify using the scale" (p. 236). Wylie, like Bentler, was critical of the lack of evidence about the TSCS factor structure and the discriminant validity of its many scores.

Factor Analyses of TSCS Responses

Numerous exploratory factor analyses (EFAs) of TSCS responses (e.g., Bolton, 1976; Boyle & Larson, 1981; Fitzgibbons & Cutler, 1972; Gaber, 1984; Gable, La Salle & Cook, 1973; Hoffman & Gellen, 1983; Lang & Vernon, 1977; Pound, Hansen & Putnam, 1977; Rentz & White, 1967; Roffe, 1981; Tzeng, Maxey, Fortier & Landis, 1985; Vacchiano & Strauss, 1968; also see Wylie, 1974) have been conducted, but are not easily summarized. The findings vary substantially depending on the number of factors retained and whether item or scale scores were analyzed. Many studies are uninterpretable because scales based on overlapping sets of items that force spurious correlations (i.e., the 5 EXT and 3 INT scores described above) were factor analyzed (e.g., Gaber, 1984; Pound, Hansen & Putnam, 1977; Rentz & White, 1967; Roffe, 1981; also see Wylie, 1974). Across the other studies there was better support for the EXT scales -- particularly the Social, Family, and perhaps the Physical scales -- than the INT scales. Nevertheless, if enough factors were retained in analyses of item responses (e.g., Vacchiano & Strauss, 1968; Gable, et al., 1973), or items within a single EXT scale were analysed (e.g., Tzeng, et al.), then differentiable subcomponents were found for each EXT scale. For example, the Physical scale has components reflecting physical health, physical attractiveness, and neatness of appearance, whereas the Moral scale has components reflecting religion, honesty, and morality. In analyses of item responses, factors reflecting a majority of the items from any one internal scale were unusual, though some factors reflected primarily the intersection of an EXT and an INT scale. For analyses of scale scores, however, support for INT scales -- particularly the Satisfaction scale -- seemed stronger. In some studies there were negative-item factors that may represent a method effect or response bias (see Marsh, 1986a, 1987b; Carmines & Zeller, 1979; for discussion of negative item factors in self-concept research). In one of the earliest studies, Vacchiano and Strauss concluded that "the TSCS is a complex measure of self" (p. 326) but found that most of their empirically derived factors reflected subcomponents of specific EXT scales. Subsequent research seems to support these conclusions.

The Present Investigation

The purpose of the present investigation is to further examine the construct validity of responses to the TSCS. This was accomplished by examining the internal structure of responses to the TSCS and by examining relations between TSCS responses and external constructs. The internal structure of TSCS responses was examined with three analytic strategies: (a) exploratory factor analyses (EFA) of item and scale responses; (b) confirmatory factor analyses (CFA) in which a priori factors corresponding to the design of the TSCS were postulated; and (c) an ANOVA model adapted from multitrait-multimethod (MTMM) research to examine the portions of variance explicable by EXT scales, by INT scales, by positively vs. negatively worded items, and by various interactions among these effects. The external validity of the TSCS responses was tested with an adaptation of MTMM analysis. First, TSCS responses were related to responses from the Self Description Questionnaire (SDQ) III, a self-concept instrument that has a particularly well defined factor structure. Second, TSCS responses were related to ratings by external observers.

METHODS

Subjects, Design and Procedures

Subjects were 343 participants in one of 9 Outward Bound courses offered in 1985 or 1986. The Outward Bound program is a 26-day residential program that consists of vigorous outdoor activities that promote both individual initiative and group cooperation. Participants were between 16 and 37 years of age (Median = 21), most were unmarried, 3/4 were male, and they represented a wide range of socioeconomic backgrounds. A majority had been employed on a full-time basis during the year prior to the course and about 1/3 had been full-time students. A more detailed description of the Outward Bound program, its impact on multidimensional self-concepts, and the type of students who participate in it are presented by Marsh, Richards and Barnes (1986a, 1986b). As part of a larger research program, participants completed the TSCS and SDQIII on the first day of the course, and were rated by external observers on the last day of the course.

The Measurement Instruments

TSCS. Fitts (1965) described the development and use of the TSCS, and this was briefly summarized earlier. Analyses described here are based on the 90 TSCS items, half of which are negatively scored, that are responded to on a 5-point response scale that varies from "completely true" to "completely false." The additional 10 items from the MMPI lie scale are not

considered here. As recommended in the Manual (Fitts, 1965), negatively scored items were reverse scored, and then item responses were summed to form various scale scores. Because the TSCS was completed as part of the Outward Bound program, there were nearly no missing responses (less than 1/10 of 1%). For each subject, scale scores were based on the mean of nonmissing responses. The scale scores to be considered and internal consistency estimates are described in more detail as part of the analysis (see Table 7).

SDQIII. The SDQIII is a 136-item multidimensional self-concept instrument that measures 13 dimensions of self-concept. Each of the 13 SDQ III scales is represented by 10 or 12 items, half of which are negatively worded (see Marsh & O'Niell, 1984, for the wording of the items), and subjects respond on an eight-point "1-Definitely False" to "8-Definitely true" response scale. Previous SDQIII research (e.g., Byrne & Shavelson, 1986; Marsh, 1986b, 1986c, 1987c; Marsh, Barnes & Hocevar, 1985; Marsh & Jackson, 1986; Marsh & O'Niell, 1984; Marsh, Richards & Barnes, 1986a, 1986b) has shown that the SDQIII responses are reliable, are stable, and have convergent and discriminant validity with respect to the ratings by external observers, to performance on academic achievement measures, and to participation in athletics. In this previous research factor analyses, both EFAs and CFAs, have clearly identified all the 13 factors of self-concept that the SDQIII was designed to measure.

Summary descriptions of the 13 SDQIII scales are: (a) Math -- I have good mathematical skills/reasoning ability; (b) Verbal -- I have good verbal skills/reasoning ability; (c) Academic -- I am a good student in most school subjects; (d) Problem Solving -- I am good at problem solving/creative thinking; (e) Physical Ability -- I am good at sports and physical activities; (f) Appearance -- I am physically attractive/good looking; (g) Relations With Same Sex -- I have good interactions/relationships with members of the Same Sex; (h) Relations With Opposite Sex -- I have good interactions/relationships with members of the Opposite Sex; (i) Relations With Parents -- I have good interactions/relationships with my parents; (j) Spirituality/Religion -- I am a religious/spiritual person; (k) Honesty-- I am an honest/reliable/trustworthy person; (l) Emotional Stability -- I am an emotionally stable person; (m) General Self Esteem -- I have self-respect, self-confidence, self-acceptance, positive self-feelings, and a good self-concept.

SDQIII responses were collected as part of the Outward Bound program under the supervision of Outward Bound staff, and so there were nearly no

missing responses (less than 1/10 of 1%). For present purposes, each SDQIII scale score was defined as the mean of nonmissing responses to items in that scale. An unreported factor analysis of SDQIII responses conducted as part of the present investigation clearly replicated the findings reported by Marsh, Richards, and Barnes (1986a, 1986b). Internal consistency estimates are presented as part of the analyses (see Table 7).

External Observer Ratings.

For most of the Outward Bound program, participants work in small groups, and activities are specifically designed to foster intense interaction and cooperation among group members. Hence, by the end of the 26-day residential program, group members had observed each other in a wide range of experiences. On the last day of the program participants were asked to complete additional summary instruments describing other members in their group. For this task, each participant was asked to rate "which of the these people have got to know you the best throughout your varying experiences at Outward Bound." On the basis of these ratings group members were chosen to infer the multidimensional self-concepts of each person in the group, subject to the constraint that all participants served as external observers for the same number of individuals and each individual was rated by two external observers. In inferring the multidimensional self concepts, external observers were told: "Judge the statements AS YOU THINK THE PERSON YOU ARE JUDGING WOULD FILL THEM IN, if asked to do so. You should base your responses on everything you know about that person, i.e., what they say, what they do, the way they think about things in general and think about themselves."

External observers responded to 12 single-item scales designed to parallel 12 of the 13 SDQIII scales, all but General Esteem, on a 9-point "very inaccurate" to "very accurate" response scale. The wording of the 12 items is the same as the summary descriptions presented above. Marsh, Barnes and Hocevar (1985; also see Marsh, 1986b) have previously used these same scales for this purpose, and found support for their convergent and discriminant validity in relation to responses to the SDQIII.

External observer ratings were collected as part of the Outward Bound program, and so there were virtually no missing values. For purposes of the present investigation, each of the set of 12 external observer ratings was taken to be the mean of nonmissing responses across the two external observers. The external observer ratings were collected for all but two of the Outward Bound courses considered in the present investigation, and resulted in external observer ratings for 280 subjects. Because each scale was

defined by a single response, internal consistency estimates of reliability could not be determined. The agreement between responses by two independent external observers, however, does constitute a reliability estimate and is presented as part of the presentation of results (see Table 8).

The Internal Structure of TSCS Responses

Exploratory Factor Analyses.

Adopting an exploratory framework, over two hundred EFAs of responses to the TSCS were conducted. These varied with respect to the number of factors retained (as few as 3 to as many as 20), the type of rotation, and the level of aggregation. Separate sets of analyses were done on responses to the 90 TSCS items, the 3x5=15 scales representing all combinations of the INT and EXT facets, and the 3x5x2=30 scales that also separated responses to positively and negatively worded items. Additional EFAs were performed on each of the 5 sets of 18 items representing each of the EXT scales. Because so many factor analyses were conducted there is a degree of arbitrariness in the selection of results that are actually presented. An attempt was made to select solutions that were most interpretable, solutions that were well defined in that each factor had at least two (and preferably more) substantial loadings, and solutions that corresponded most clearly to a priori factors that the TSCS was designed to measure.

Analyses of 90 item responses. The first results are for EFAs of responses to the 90 TSCS items. The 9-factor oblique solution (Table 1) provides clear support for three EXT scales -- Family, Social, and Physical. For each of these scales a majority of items (at least 13 of 18 items) designed to define it load positively on the same factor, the items represent both positively and negatively worded items, and the items represent all three INT scales. Several items from the Personal/Identity cell (e.g., I'm a cheerful person) load instead on the Social factor, suggesting that they may be misclassified.

Insert Table 1 About Here

Factor 9 provides some support for the Personal scale, but its interpretation is more ambiguous: only 8 of 16 items designed to measure this scale have substantial loadings (none higher than .41), these come primarily from the Behavior scale, and several items from other scales have loadings as high or higher than any of the Personal items. Factor 9 seems to reflect a lack of persistence/decisiveness rather than a general Personal self.

Moral items contribute substantially to three different factors. Eight of the 16 Moral items, primarily from the Identity scale, load substantially

on factor 6. Because of the strong evaluative component of these items factor 6 can be interpreted as a "good person" factor. Four of the moral items define a bipolar religion factor, factor 7, that may cause problems in the interpretation of TSCS scores. Three Moral (religion) Satisfaction items (e.g., I ought to go to church more) load positively on factor 8 but the Identity item "I am a religious person" has a substantial negative loading. That is, it is respondents who think of themselves as religious persons who feel more dissatisfied with themselves in relation to religion. Whereas this pattern may be consistent with Fitts' original conceptualization of the Satisfaction scale, it may be inconsistent with summing across all Moral items to form a moral scale score. Factor 8 is also a religious or ethical factor, but it is unidimensional in that all substantial loadings are in the same direction. (The bipolar religion factor and a separate unidimensional religion/ethical factor were also reported by Gable, et al., 1973).

Factor 2 can be interpreted as a weak negative-item factor because all 10 items that define it are negatively worded items. These 10 negatively worded items represent all 5 EXT scales, but 8 of the 10 items come from the Satisfaction INT scale. Whereas this factor is clearly distinguishable, it is not clear whether it is substantively important or a substantively irrelevant method effect.

Factor 4 seems to be a weak Satisfaction factor. All 5 items that have substantial positive loadings come from the Satisfaction scale, though these represent only 2 of 5 EXT scales. Many other Satisfaction items, however, have small positive loadings on the factor. In contrast, many of the Identity and Behavior items have small negative loadings. This pattern appears to be similar to that observed with the bipolar religion factor.

In summary, factor analyses of the 90 TSCS items provide good support for only the Physical, Social and Family scales of the TSCS. The results also suggest an effect of negatively worded items that may be a response bias and potential problems in the interpretation of Satisfaction items.

Thirty (5x3x2) TSCS scales. Thirty scales, each the sum of responses to three items, were formed to represent all possible combinations of the 5 EXT scales, the 3 INT scales, and the positively and negatively worded items. Factor analyses of these scales have both advantages and disadvantages compared to analyses of item responses. Because measured variables are based on responses to three items, they are more reliable, more generalizable, and less influenced by idiosyncratic uniqueness in each item. However, the items used to form each scale must be reasonably homogeneous and derived

factors cannot be readily interpreted with respect to individual item content. Five of the 7 factors (Table 2) are similar to factors based on item responses; the Physical, Social and Family factors representing 3 EXT scales, a bipolar Moral factor, and a negative item factor. The other two factors are defined by both Moral and Personal items, though one is defined primarily by positively worded items and the other by negatively worded items.

Insert Tables 2 & 3 About Here

Fifteen (5x3) scales. Fifteen scales, each the sum of responses to six items, were formed to present all possible combinations of the 5 EXT and 3 INT scales. Three of the 5 factors (Table 3) correspond to the Physical, Social and Family scales that were identified in Tables 1 and 2. Factor 2 is like the Satisfaction factor identified in Table 1. Factor 5 is defined by Identity and Behavior scales from the Personal and Moral factors. Because each measured variable was the sum of responses to 3 positively and 3 negatively worded items, it was, of course, impossible to obtain a negative-item factor.

Other, unreported analyses. Forty-five "item-pair" scales, each the sum of responses to 2 items, were formed by pairing a positively worded and negatively worded item representing the same INT and the same EXT scale. Thus, each of the 15 cells in Fitts' 3x5 schema was represented by 3 item pairs each consisting of a positively and a negatively worded item. The selected factor solution (not shown) had nine factors similar to those in Table 1. They differed in that a negative item factor was not possible because of the way the scales were formed and one additional factor interpreted to represent Family Satisfaction was identified.

Additional, unreported EFAs were conducted for each of the 5 sets of 18 items that define the 5 external scales. Between 2 and 5 interpretable factors were found for items from each EXT scale: (a) Physical (Fit/healthy body; Neat appearance; Attractiveness; Sickness); (b) Moral (Honest, reliable, trustworthy; Bipolar religion (as in Table 1); Religion/Ethics); (c) Personal (Personal Satisfaction; Calm, easy-going; Negative self-Identity; Self-reliant; Lack of persistence/decisiveness); (d) Family (Family Satisfaction; Family Identity; Active role; Family dissatisfaction); (e) Social (Social; Social dissatisfaction). Whereas these results indicate that none of the external scales is clearly unidimensional, they are not easily summarized. Most of the subcomponents representing each scale are distinguishable on the basis of specific item content. Others reflect the influence of specific INT scales -- particularly Satisfaction -- or the

influence of positively and negatively worded items.

Confirmatory Factor Analysis.

In CFA the researcher posits an a priori model and tests its ability to fit the data. The general approach is to: (a) examine parameter estimates in relation to the substantive, a priori model (and also for improper solutions); (b) evaluate the model in terms of indices of fit such as the X^2, the X^2/df ratio, the Tucker-Lewis Index (TLI), and the Bentler-Bonett Index (BBI; Bentler & Bonett, 1980; also see Marsh, Balla & McDonald, 1986); (c) compare the fit of alternative, a priori models; and, perhaps, (d) test new, a posteriori models if the a priori models do not perform adequately or if further clarification of a priori structures is needed. The application of CFA and its advantages over EFA are well known (e. g., Bentler & Bonett, 1980; Joreskog & Sorbom, 1981; Long, 1983; Marsh & Hocevar, 1983; 1985; McDonald, 1985; Pedhauzur, 1982) and will not be reviewed here.

In CFA studies, measured variables are typically posited to be influenced by just one factor in what may be referred to as a single facet test design. In the present investigation, each measured variable is posited to be influenced by an external frame of reference, an internal frame of reference, and, perhaps, the positive or negative wording of items. In this respect the TSCS represents a two-facet or even a three-facet test design. Hence, the present application of CFA is more complicated than typical.

A particularly popular application of CFA to a two facet design is the analysis of MTMM data. For MTMM data, the one facet consists of the multiple traits whereas the second facet consists of the multiple methods. Each measured variable is posited to represent the influence of one trait and one method. In MTMM analyses the trait facet is posited to represent validity whereas method facets are posited to reflect invalidity, but this interpretational distinction has no effect on the actual analyses. The application of CFA to the two-facet MTMM design has been reviewed by Widaman (1985) and Marsh (in press; 1987c; Marsh & Hocevar, 1983). These researchers describe a systematic set of a priori models used to test the influence of each of the facets. The general approach advocated by these researchers and the CFA models that they summarized are adapted in the present investigation of responses to the TSCS. Marsh (in press; Marsh, Barnes & Hocevar, 1985) also proposed a three-facet MTMM design in which an additional facet is added (e.g., traits, methods and occasions).

The TSCS was developed according to a three-facet fully crossed test design. The three facets are the 5 external frames of reference (EXT), the 3

internal frames frames of reference (INT), and the positive or negative wording of items (PN). In the present analyses each of the 30=5x3x2 cells of this 3-facet test design is represented by one scale that is the sum of responses to 3 items. The 30x30 matrix of correlations among these scale scores was the basis of the CFAs. Whereas it is possible that parsimonious models reflecting just one of the facets (e.g, a five-factor model consisting of the EXT scales or a 3-factor model consisting of the INT scales) could adequately describe this data, the results of the EFAs suggest this to be unlikely.

One plausible model that is consistent with the TSCS design (see Table 4) posits 10 a priori factors. According to this model, each of the 30 measured variables loads on 1 of 5 EXT factors, 1 of 3 INT factors, and 1 of 2 PN factors; the remaining 7 factor loadings are fixed to be zero. In order to maintain the independence of the facets and also in order for the model to converge to a proper solution, it is necessary for factors representing different facets to be uncorrelated. That is, correlations among the 5 EXT factors, among the 3 INT factors, and among the 2 PN factors are freely estimated, but all other factor correlations are fixed to be zero. Models like this one are typically used in the CFA of MTMM data and have been evaluated extensively in that context (Marsh, in press; 1987c; Widaman, 1985).

Insert Tables 4 & 5 About Here

A detailed progression of alternative models was posited to test the ability of each facet, each pair of facets, and all three facets to fit the data (Table 5). In the first, most parsimonious model (Model 1) a single factor that might correspond to total self-concept is posited. One-facet models positing only 2 PN factors (Model 2), only 3 INT factors (Model 3), or only 5 EXT factors (Model 4) each do substantially better than Model 1, indicating that Model 1 is inadequate. Model 4 fits the data better than Models 2 or 3, suggesting that the EXT facet has the greatest influence. Two-facet models (Models 5, 6 and 7), however, perform better than any of the one-facet models, indicating that the one-facet models are inadequate. Finally, the three-facet model (Model 8) that posits 5 EXT factors, 3 INT factors, and 2 PN factors provides a substantially better fit than do any of the two-facet models.

Several approaches were taken in evaluating Model 8. Guidelines of what value a fit index must attain in order for a model to be judged as providing an adequate fit must be interpreted cautiously. Nevertheless, a X^2/df

ratio of 1.53 for Model 8 -- particularly given the moderately large sample size -- and a TLI of .93, are typically interpreted to indicate an adequate fit. Inspection of the modification indices provided by LISREL (see Joreskog & Sorbom, 1981) provide an estimate of the improvement in fit that would result in freeing any particular parameter. For the total of 671 parameters fixed to be zero (210 factor loadings, 26 factor correlations, and 435 uniquenesses correlations), the largest modification index was 9.1. Of particular relevance, none of the factor correlations that were fixed to be zero had a modification index of more than 5. In summary these results, along with the comparisons with alternative models, indicate that the fit of Model 8 is adequate.

The inspection of the parameter estimates (Table 4) is important for evaluating a solution. Factor loadings for 4 of the 5 EXT factors, all but the Moral factor, are well defined in that all factor loadings are positive and statistically significant. The factor loadings for the Personal factor, however, are smaller than those for Physical, Social and Family factors. For the Moral factor, 3 of 6 factor loadings are nonsignificant. Whereas the factor loading for the Moral/Identity/positive scale is substantial and positive, the factor loadings for the two Satisfaction scales are negative. It should be noted that a similar pattern of factor loadings was observed for each of the EFAs (the factor labelled bipolar religion in Tables 1-3).. In summary, interpretations of the 5 EXT factors are reasonable and generally consistent with results based on the EFAs, though the Moral factor is different from the one proposed by Fitts.

Each of the 3 INT factors is well defined in that all 10 factor loadings defining each factor are statistically significant and positive. Consistent with the Fitts' interpretation of the Satisfaction scale, the Identity and Behavior factors are more highly correlated with each other (.83) than with the Satisfaction factor (.61 & .75). The very high correlations among all three INT factors suggests either a general self-concept that influences responses to all 3 INT scales or a halo effect. Whatever the explanation, the INT factors -- particularly the Identity and Behavior factors, are not well differentiated.

The negative item factor is well defined in that all factor loadings are positive and 14 of 15 are statistically significant. In contrast, only 5 of 15 factor loadings on the positive item factor are significant, and two of these are negative. This suggests that the positive item factor is weak and that its interpretation may be ambiguous. One additional model in which

the positive item factor was eliminated was tested in order to further examine this influence. Whereas the elimination of the positive item factor led to a modestly (statistically significant) poorer fit, its elimination had little effect on other parameter estimates.

The Application of the MTMM Anova Model.

Stanley (1961; also see Kavanagh, Mackinney & Wolins, 1971; Marsh & Hocevar, 1983) demonstrated that when repeated measurements of subjects are measured across all levels of two different facets (e.g., the EXT and INT facets of the TSCS), three orthogonal sources of variance can be estimated. The main effect due to subjects is a test of how well the total scores (e.g., total self-concept) differentiate among subjects. If this effect is nonsignificant or small, then total scores are similar for all subjects. The two-way interactions between subjects and each facet reflect the extent to which overall differentiation between subjects depends on that facet. If an interaction is small or nonsignificant, then the facet has no discriminant validity in that raters are ranked the same for each level of the facet (e.g., the rank order of individuals is the same for each of the EXT scales). If an interaction is large, a facet has discriminant validity in that subjects are differentially ranked depending on the level of the facet (e.g., subjects are ranked differently for the Physical and Social scales). The main effects of each facet and their interaction are typically of little interest in this analysis, and will be zero if all scales are standardized to have the same mean and standard deviation. The three-way interaction (e.g., subjects x EXT x INT) is assumed to represent only random error, and is used to test the statistical significance of the other effects. Consequently, there is an implicit assumption that differentiation among subjects does not depend the interaction between the two facets, and this is frequently cited as an important weakness of this model (e.g., Marsh & Hocevar, 1983). Stanley (1961) noted, however, that it is possible to expand the two-facet design so that this third-order interaction can be estimated independently of the error term.

For purposes of the present investigation the ANOVA model is expanded to include all three facets of the TSCS design. This provides a test of the PN facet as well as the INT and EXT facets. Variance can be partitioned into seven orthogonal sources (see Table 6) in this four factor unreplicated ANOVA model. The highest order interaction term (subjects x INT x EXT x PN) is still assumed to represent random error. This expanded model, however, provides a test of whether differentiation among subjects depends on any of

the two-way interactions among the three facets. In particular, the subjects x EXT x INT term that could not be estimated for the two-facet model is testable in this expanded three-facet model.

Insert Table 6 About Here

In the present investigation, because the df are so large, all sources of variance are statistically significant. The variance components (Table 6) provide an indication of the relative size of the effects. The largest source of non-error variance is due to subjects, suggesting a general self-concept that influences all ratings or, perhaps, a generalized halo effect that influences the self-report responses. The next largest source is due to the subjects x EXT interaction, providing support for the discriminant validity of the EXT scales. Differentiation among subjects also depends on INT and PN facets and, to a smaller extent, the EXT x INT interaction. The remaining sources of nonerror variation, though statistically significant, are smaller.

The results provide support for the discriminant validity of the EXT and INT facets that were most important in the design of the TSCS. Differentiation among subjects also depends on whether the TSCS items are positively or negatively worded, and this may represent the influence of a response bias. Differentiation among subjects depends to a lesser extent on the two-way interactions among the facets -- particularly the EXT x INT interaction. That is, differentiation among subjects depends not only on the effects of the INT and EXT facets, but also on particular combinations of these facets. This finding may be consistent with the design of the TSCS, but appears to be inconsistent with the scale scores that are typically used to summarize TSCS responses. The recommended scores represent the marginal scores in the 3x5 design of EXT and INT facets (e.g., Physical responses averaged across the three INT scales and Identity responses averaged across the 5 EXT scales). To the extent that particular combinations of the INT and EXT facets have discriminant validity, however, it may be more appropriate to report scores for all 3x5=15 combinations of these facets.

Relations Between TSCS Responses and External Constructs

Tests of the internal structure of the TSCS responses provide important evidence about its construct validity. Different analytic procedures, for example, provide clear support for differentiation among the Physical, Social, and Family scales of the TSCS. An implicit assumption, of course, is that the basis of this differentiation is consistent with interpretations of the scales. Support for this assumption requires that the TSCS responses be

related to external constructs. The problem of determining appropriate external criteria is, however, an important obstacle. Self-concept responses are intended to represent the respondents own self-perceptions whether or not these are reasonable in relation to objective external criteria or the observations of external observers. Two frequently used criteria for validating responses to a self-concept instrument are responses to other self-concept instruments and the observations of external observers.

Relations Between TSCS and SDQIII Responses

A frequently used approach to validating responses to one instrument is to correlate the responses from it to responses from other instruments that are designed to measure similar constructs. When both instruments are based on self-report responses by the same person, it may be dubious to interpret this approach as a test of external validity. Nevertheless, tests of the consistency of responses across independently constructed instruments do provide a valuable source of information about the construct validity of responses to each instrument. Because few self-concept instruments have a well-defined structure, this approach is usually applied to correlations between total scores (see Wylie, 1974). To the extent that responses to each instrument are correlated, then responses are not idiosyncratic to either instrument. A much stronger application of this approach is possible, however, when two or more multidimensional self-concept instruments are designed to measure similar components. Using the logic of MTMM analysis, scores for matching scales from different instruments should be substantially correlated, whereas scores between nonmatching scales should be substantially less correlated. When the intended scales from each instrument are strictly parallel, or when only matching scales are selected from different instruments, the data can be analyzed with the traditional approaches to MTMM data (e.g., Byrne & Shavelson, 1986). Even when the scales from the different instruments are not strictly parallel, the logic of MTMM analyses can be adopted (Marsh & Smith, 1982).

TSCS responses are validated against SDQIII responses in the present investigation, and the SDQIII is particularly well-suited for this purpose. First, the factor structure for responses to the SDQIII is well-defined as shown for the data used here and in many previously published factor analyses. Second, there seems to be a reasonably clear correspondence between the TSCS EXT scales and the SDQIII scales: (a) the TSCS Family scale corresponds to the SDQIII Parents scale; (b) the TSCS Social scale corresponds to the Same Sex and Opposite Sex scales on the SDQIII (c) the

TSCS Physical scale corresponds to the Physical Ability and Physical Appearance scales on the SDQIII; (d) the TSCS Moral scale corresponds to the Honesty/Trustworthiness and the Spiritual/Religion scales on the SDQIII; (e) the TSCS Personal scale is not so obviously related to SDQIII scales, but appears most like General Esteem and, perhaps, Emotional Stability; (f) the TSCS has no specifically academic self-concept scales corresponding to the Academic, Math, Verbal, and Problem Solving scales of the SDQIII, though some items in the TSCS Personal scale may relate to these academic components. Whereas several EXT TSCS scales appear to correspond to more than one SDQIII scale, EFAs of the EXT items suggest that these scales contain differentiable subcomponents that may correspond more directly to specific SDQIII scales. Also, Marsh (1987c) has posited higher-order SDQIII factors in which two or more scales are combined that may correspond more directly to the TSCS scales.

Correlations between the 5 TSCS EXT scales and the 13 SDQIII scales are presented in Table 7. Correlations between scales posited to be matching (indicated with asterisks) are like convergent validities in MTMM analyses. Applying the logic of MTMM analyses these 9 convergent validities should be substantial and substantially higher than correlations between non-matching TSCS and SDQIII scales. The median of these 9 correlations, .60, provides support for convergent validity. Eight of the 9 convergent validities vary between .53 to .71, the one exception being the near-zero correlation between the TSCS Moral and the SDQIII Spiritual/Religion scales. In contrast to these substantial convergent validities, the median of the remaining 56 correlations is only .30 and just two of these correlations are greater than .5 (both these involve the SDQIII General Esteem scale which should be substantially correlated with other areas of self-concept). In general, these results provide support for both the convergent and discriminant validity of responses to the TSCS and the SDQIII.

Insert Table 7 About Here

The three smallest convergent validities involve the the TSCS Physical and Moral scales -- particularly the near-zero correlation between TSCS Moral and SDQIII Spiritual/Religion scales. A more detailed analysis of the Identity, Satisfaction, and Behavior components of these TSCS scales, however, reveals some interesting anomalies. The SDQIII Spiritual/Religion scale is substantially correlated (.51) with the Moral/Identity scale, not significantly correlated (.08) with the Moral/Behavior scale, and significantly <u>negatively</u> correlated (-.38) with the Moral/Satisfaction scale.

This apparently represents the influence of the bipolar religious component identified in the TSCS Moral responses in earlier factor analyses. In contrast, the SDQIII Honesty/Trustworthiness scale is most highly correlated with the Behavior component of the TSCS Moral scale. The SDQIII Physical ability scale correlates only .53 with the TSCS Physical scale. It, however, correlates .60 with the Physical/Behavior scale and only .39 and .34 with the Physical/Identity and Physical/Satisfaction scales. In contrast, the SDQIII Physical Appearance scale correlates .51, .69, and .53 with the Identity, Satisfaction and Behavior components of the TSCS Physical scale.

As summarized earlier, EFAs of the TSCS Physical and Moral items suggested that these scales could be differentiated into distinguishable components: (a) Physical (Fit/healthy body; Neat appearance; Attractiveness; Sickness); (b) Moral (Honest, reliable, trustworthy; Bipolar religion; Religion/ethics). The contents of several of these TSCS factors seem to correspond more closely to SDQIII scales than do the TSCS Physical and Moral scales. In order to test this observation, factor scores were derived from the factor analyses of the TSCS Physical items and of the TSCS Moral items, and were related to the SDQIII scales (Table 7). The SDQIII Physical Ability scale was substantially more highly correlated with the Fit/healthy body factor score (.66) than with any of the other factor scores or the TSCS Physical scales (in Table 7). The SDQIII Physical Appearance scale was more substantially correlated with the Attractiveness factor score (.76) than with other factor scores or the TSCS scales in Table 7. The SDQIII Spiritual/Religion and the TSCS Bipolar religion factor score were more highly correlated (.76) than any other pair of TSCS and SDQIII scores. Finally, the SDQIII Honesty/trustworthiness scale was more substantially correlated with the corresponding factor score (.54) than with other factor scores or the TSCS scales in Table 7. It had been expected that the TSCS Religion/ethics factor score would be more substantially correlated with the SDQIII Spiritual/Religion scale. It should be noted however, that this factor was the most poorly defined of the TSCS factors considered in Table 7 (it had no factor loadings greater than .45 whereas all other factors had at least three factor loadings between .5 and .80) and was the second factor related to religion extracted from the TSCS Moral items.

In summary, these analyses provide strong support for both the convergent and discriminant validity of responses to the TSCS and SDQIII. Further analyses, however, revealed important anomalies in some of the TSCS scales. For the TSCS Physical and particularly the Moral items, well defined

subcomponents were substantially more highly correlated with corresponding SDQIII scales than were the total scale scores. These additional analyses, then, provided stronger support for the construct validity of the SDQIII scales -- particularly the Spiritual/Religion scale -- and also provided convincing evidence of the multidimensionality of some of the TSCS EXT scales. These further analyses also suggested, however, that distinctions between the Identity, Satisfaction, and Behavior subcomponents of some EXT scales may reflect systematic content differences in the items used to define the subcomponents instead of, or in addition to, the influence of the INT frames of reference. For example, the TSCS Physical/Behavior scale was most highly correlated with the SDQIII Physical Ability scale whereas the TSCS Physical/Satisfaction scale was most highly correlated with the SDQIII Physical Appearance scale. As noted earlier, even when the existence of a priori factors are supported, the interpretation of these factors should be tested with external constructs.

Ratings By External Observers.

Multidimensional self-concept ratings were inferred by each of two external observers for 12 single-item rating scales designed to parallel 12 of the 13 SDQIII scales (all but General Esteem). Thus, the hypothesized relations between the external observer ratings and the TSCS responses is the same as posited for the TSCS and SDQIII scales except for General Esteem. Correlations between the 12 observer rating scales and the 5 TSCS EXT scales (Table 8) provide only modest support for convergent validity. The 8 convergent validities range from .05 to .31 (median = .23) and 7 are statistically significant. The one nonsignificant convergent validity is the correlation between the Spiritual/religion scale and the TSCS Moral scale. Despite these modest convergent validities, there is reasonable support for the discriminant validity of responses to the TSCS Family, Social, and Physical scales. Whereas the magnitude of correlations between observer ratings and TSCS EXT scales is much lower than observed between SDQIII and TSCS scales, the pattern of results is similar.

Insert Table 8 About Here

The only nonsignificant convergent validity was between Spiritual/religion observer scale and the TSCS Moral scale. The Identity component of the TSCS Moral scale, however, is substantially correlated with this external observer rating (.29) whereas the TSCS Moral/Satisfaction scale is negatively correlated with it. Furthermore, the TSCS factor labeled Bipolar Religion correlates .40 with the Spiritual/religion scale, and

represents the highest correlation between any TSCS scale and observer ratings. This anomalous pattern is like that observed for the TSCS Moral and the SDQIII Spiritual/religion scales. The factor scores derived from the TSCS Physical items also provide modest support for the separation of different physical factors.

The external observer ratings may, perhaps, also provide a basis for testing the validity of the INT scales. Results from Table 7 suggest that the SDQIII scales are more consistently correlated with Identity and, to a lesser extent, Behavior scales than to Satisfaction scales. Behavior is, however, the most obvious basis for external observers to form inferred self-concept ratings. Intuitively it would seem that external observer ratings should be most highly correlated with Behavior ratings and least correlated with Satisfaction ratings. Results in Table 8, however, provide no support for these expectations. The Behavior scale tends to be less correlated with observer ratings than the Identity scale and even the Satisfaction scale (except for the Moral responses that were already discussed). Whereas there may be plausible counter-explanations of these findings, they provide no support for the construct validity of the TSCS INT scales.

The observer rating scales were specifically designed to parallel 12 of the SDQIII scales, and so observer ratings may be more highly correlated with SDQIII responses than TSCS responses. Correlations among the 12 observer rating and corresponding SDQIII scales indicate that the 12 convergent validities vary from .17 to .57 (median r = .35), all are statistically significant, and only one (Emotional Stability) is less than .25. With the exception of the Emotional Stability scale, there is also clear support for discriminant validity. These results provide much stronger support for the validity of the external observer ratings than did the TSCS responses.

The purpose of the external observer ratings for analyses summarized here was to validate TSCS and SDQIII responses. Whereas this empirical use of observer ratings is legitimate, research on relations between self-concept and self-concept inferred by significant others has a long and important theoretical history (e.g., Marsh, Barnes & Hocevar, 1985). There are, however, important limitations in the use of external observer ratings. First, most research has found disappointingly small correlations between self-report responses and the observations of external observers (e.g., Shrauger & Schoeneman, 1979). Second, because the observer ratings were designed to parallel the SDQIII scales, they may be more relevant as a test of the validity of the SDQIII responses than the TSCS responses that were

the focus of this study. Third, single-item rating scales such as those used by the external observers are known to have poorer psychometric properties than the multi-item scales such as the SDQIII and TSCS scales. Results in Table 8 show that the reliability of the external ratings as inferred from agreement between the two observers (median = .47) is disappointingly low. Marsh, Barnes and Hocevar (1985) correlated SDQIII responses with external observer ratings based on the single-item scales used here and multi-item scales. Whereas support for convergent and discriminant validity was found for observer ratings on single-item scales, better support was found for observer responses to multi-item scales. Fourth, external observers in the present investigation only knew the participants within the context of the 26-day Outward Bound program. Marsh, Barnes and Hocevar (1985), for example, specifically asked individuals to select the person in the world who knew them the best, and these individuals were able to infer self-concepts much more accurately than the external observers considered here. Hence, the modest support for the construct validity of ratings by external observers -- despite all these limitations -- is surprisingly good.

Summary and Discussion

The TSCS is one of the few self-concept instruments developed prior to the 1970s that was specifically designed to measure a priori dimensions of self-concept. Nevertheless, reviewers have been critical of the lack of empirical information about the TSCS structure and support for the discriminant validity of its scales. Subsequent research, primarily EFAs of item or scale responses, has not resolved this problem. The purpose of the present investigation was to examine further support for the construct validity of the TSCS.

The internal structure of the TSCS was examined with factor analyses and analyses adapted from MTMM research. Each of these analyses indicated the multidimensional nature of the TSCS responses, but empirically derived factors were sometimes not clearly related to the scales which the TSCS was intended to measure. There was clear and consistent support for three of the EXT scales -- Physical, Social and Family, but not for the remaining scales. The Moral scale was complicated by the existence of a bipolar religious component that has been reported in previous research. Personal self appears to be the least specific of the EXT scales and was not consistently identified as a differentiable factor.

Interpretations of correlations between TSCS responses, SDQIII responses, and the external observer ratings provided support for

interpretations of TSCS's internal structure. Support for convergent and discriminant validity was strongest for the TSCS Physical, Social and Family scales. Only when the TSCS Moral scale was separated into subcomponents was its relation to SDQIII and observer responses clarified. The TSCS Personal factor was most strongly related to the SDQIII General Esteem scale, though it is not clear that it was intended to be such a scale.

There was little support for the TSCS INT scales in the present investigation. These scales were not clearly identified in the EFAs, and were so highly correlated in the CFAs as to be difficult to distinguish. Whereas this facet does influence TSCS responses, this influence may reflect the idiosyncratic wording of items used to define these scales instead of, or in addition to, the internal frames of reference that they were intended to measure. To the extent that these internal frames of reference have an effect, it seems that this effect is specific to particular EXT scales so that it may be unjustified to interpret INT scales averaged across the five EXT scales.

There was also an influence due to the wording, positive or negative, of TSCS items. It is unclear, however, whether this effect is substantively important or a substantively irrelevant method effect. Fitts (1965) suggests that differences between positively and (reverse scored) negatively worded items reflects psychological conflict in self-perceptions, and proposed a variety of conflict scores based on such discrepancies. Whereas this operationalization of conflict is not easily tested, the process is posited to be bipolar. The positive and negative item factors in the CFA of TSCS responses (Table 4), however, were not significantly correlated. In fact, it was only the influence of negatively worded items that could be readily identified. This suggests that the effect of positively vs. negatively worded items represents a response bias that is specific to negatively worded items (also see Marsh, 1987b).

One of the most interesting aspects of the TSCS design, in addition to its clearly articulated emphasis on a multidimensional self-concept, is the theoretical role of satisfaction. According to Fitts' conceptualization, Satisfaction is like the self-ideal discrepancies posited by other researchers. That is, satisfaction is the juxtaposition between accomplishments and the standards that one sets for oneself. Empirical support for discrepancy models of self-concept is generally weak (e.g., Wylie, 1974; 1979), due in part to methodological problems in the analysis of discrepancy scores, though interest in this approach continues to be strong

(e.g., Higgins, Klein & Strauman, 1985). Most researchers, however, measure actual-self and ideal-self independently, and infer self-satisfaction or esteem from the discrepancies between the two. Measuring satisfaction directly, as in the TSCS, may avoid methodological problems in the use of difference scores, but it introduces new problems as demonstrated with the bipolar religious factor. Individuals who had religious identities (e.g., responded more positively to the item "I am a religious person") had lower self-satisfaction in relation to religion (e.g., responded negatively to the item "I am as religious as I want to be"). This distinction is lost, however, when responses are summed across Identity, Satisfaction and Behavior responses as in the TSCS EXT scales and the total score. That is, quite different levels of accomplishments and internal standards can lead to the same level of satisfaction. Whereas it may be more justifiable to sum responses across the Satisfaction items, the definition of satisfaction in relation to accomplishments and internal standards probably varies for different areas of self-concept. Furthermore, TSCS Satisfaction scale was no more highly correlated with the SDQIII Esteem scale than were the TSCS Behavior and Identity scales. In summary there appear to be problems with the operationalization of self-satisfaction in the TSCS that render its interpretation as dubious.

Fitts (1965) proposed a 3x5 schema for the design of the TSCS, and recommended the use of the 8 marginal scores in interpreting responses to the TSCS. Implicit in this recommendation is the assumption that there is no interaction between the EXT and INT facets. The identification of EFA factors that represent a particular combination of EXT and INT items, the results of the ANOVA model, the interpretation of the bipolar religion factor, and, perhaps, even Fitts' own interpretation of the Satisfaction scale suggest that this assumption is unwarranted. However, the interpretation of the 15 scales that represent the cells in this 3x5 schema may also be unwarranted. Individually, the reliability of these 15 scales is not sufficient to justify their practical application. Furthermore, the substantial correlations among many of the scales (see Table 3) would further complicate interpretations of TSCS responses based on them.

The emphasis of the present investigation has been on the examination of TSCS responses in relation to the subscales that it was designed to measure. It is also important, however, to evaluate the TSCS scale in relation to what it does not measure. Most empirical and theoretical research identifies academic self-concept as an important self-concept

dimension, particularly for school-aged individuals in Western society. Marsh (Marsh, 1986c; Marsh, Byrne & Shavelson, 1987) argue that because Math and Verbal self-concepts are nearly uncorrelated, at least two dimensions of academic self-concept should be included in multi-dimensional instruments. The exclusion of any academic self-concept scale on the TSCS seems unjustified for an instrument that is to be used by school-aged subjects.

Historically, the TSCS is important because of its popularity, because of its emphasis on multiple dimensions of self-concept and, perhaps, because of its theoretically provocative design. In the 1960s it may have represented the best of existing self-concept instruments as suggested in Crandall's 1972 review, particularly if a multidimensional measure was sought, though other reviewers were less favorable. Its continuing popularity demonstrates its heuristic value. Despite its historical importance and heuristic value, however, the TSCS in not a strong instrument when judged by current test standards. The TSCS was designed to be multidimensional, but multidimensional statistical procedures were apparently not used in the original construction/selection of items and the items have not been refined during the ensuing 30 years. From this perspective it is hardly surprising that there is weak support for many of the scales that the TSCS is designed to measure. Whereas responses to the TSCS are multidimensional, clear empirical support was found for only 3 of 5 EXT scales and for none of the 3 INT scales in the present investigation, and these findings seem to be consistent with previous research. The three-facet design of the TSCS was theoretically important, and all three facets influence responses to the TSCS. Neither the nature nor the theoretical significance of the INT and PN facets are well understood, however, and the INT facets seems to introduce unjustified complications into the interpretation of TSCS responses. Finally, the lack of an academic self seems unjustified for an instrument to be used with school-aged respondents.

REFERENCES

Bentler, P. M. & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. Psychological Bulletin, 88, 588-606.

Bentler, P. (1972). Review of Tennesse Self Concept Scale. In O. Buros (Ed.), The Seventh Mental Measurements Yearbook. Highland Park, NJ: Gryphon Press, 366-367.

Bolton, B. (1976). Factorial validity of the Tennessee Self Concept Scale. Psychological Reports, 39, 947-954.

Boyle, E. S., & Larson, P. C. (1981). Factor structure of the Tennessee Self Concept Scale for an institutionalized disabled population. Perceptual and Motor Skills, 52, 575-582.

Byrne, B. (1984). The general/academic self-concept nomological network: A review of construct validation research. Review of Educational Research, 54, 427-456.

Byrne, B., & Shavelson, R. J. (1986). On the structure of adolescent self-concept. Educational Psychologist, 78, 474-481.

Campbell, D. T. & Fiske, D. W. (1959). Convergent and discriminant validation by multitrait-multimethod matrix. Psychological Bulletin, 56, 81-105.

Carmines, E. G. & Zeller, R. A. (1979). Reliability and validity assessment. Beverly Hills, CA: Sage.

Coopersmith, S. A. (1967). The antecedents of self-esteem. San Francisco: W. H. Freeman.

Crandall, R. (1973). The measurement of self-esteem and related constructs. In J. P. Robinson & P. R. Shaver (Eds.), Measures of Social Psychological Attitudes (Revised Edition). Ann Arbor, MI: Institute for Social Research.

Dusek, J. B., & Flaherty, J. F. (1981). The development of self-concept during the adolescent years. Monographs of the Society for Research in Child Development, 46(4, Serial No. 191).

Fitts, W. H. (1965). Manual for Tennessee Self Concept Scale. Los Angeles: Western Psychological Services.

Fitzgibbons, D. J., & Cutler, R. (1972). The factor structure of the Tennessee Self Concept Scale. Journal of Clinical Psychology, 28, 184-186.

Fleming, J. S. & Courtney, B. E. (1984). The dimensionality of self-esteem: II: Hierarchical facet model for revised measurement scales. Journal of Personality and Social Psychology, 46, 404-421.

Gaber, L. B. (1984). Structural dimensions of aged self-concept: A Tennessee Self Concept study. British Journal of Psychology, 75 207-212.

Gable, R. K., La Salle, A. J., & Cook, K. E. (1973). Dimensionality of self-perception: Tennessee Self Concept Scale. Perceptual and Motor Skills, 36, 551-560.

Harter, S. (1982). The Perceived Competence Scale for Children. Child Development, 53,87-97.

Higgins, E. T., Klein, R. & Strauman, T. (1985). Self-concept discrepancy theory: A psychological model for distinguishing among different aspects of depression and anxiety. Social Cognition, 3, 51-76.

Hoffman, R. A., & Gellen, M. I. (1983). The Tennessee Self Concept Scale: A revisit. Psychological Reports, 53, 1199-1204.

Joreskog, K. G. (1974). Analyzing psychological data by structural analysis of covariance matrices. In R. C. Atkinson, D. H. Krantz, R.D. Luce, & Suppes (Eds.), Contemporary developments in mathematical psychology (Vol. 2, pp. 1-56). San Francisco: W. H. Freeman.

Joreskog, K. G. & Sorbom, D. (1981). LISREL V: Analysis of Linear Structural Relations By the Method of Maximum Likelihood. Chicago: International Educational Services.

Kavanagh, M. J., MacKinney, A. C., & Wolins, L. (1975). Issues in managerial performance: Multitrait-multimethod analyses of ratings. Psychological Bulletin, 75, 34-49.

Lang, R. J., & Vernon, P. E. (1977). Dimensionality of perceived self: Tennessee Self Concept Scale. British Journal of Social and Clinical Psychology, 16, 363-371.

Long, K. S. (1983) Confirmatory factor analysis: A preface to LISREL. Beverly Hills, CA: Sage.

Marsh, H. W. (1986a). The bias of negatively worded items in rating scales for young children: A cognitive-developmental phenomena. Developmental Psychology, 22, 37-49.

Marsh, H. W. (1986b). Global self-esteem: Its relation to weighted averages of specific facets of self-concept and their importance. Journal of Personality and Social Psychology, 51, 1224-1236.

Marsh, H. W. (1986c). Verbal and Math self-concepts: An internal/external frame of reference model. American Educational Research Journal, 23, 129-149.

Marsh, H. W. (1987a). Confirmatory factor analyses of multitrait-multimethod data: Many problems and a few solutions. (In Review; also see ERIC Document Reproduction Service No. ED xxx xxx).

Marsh, H. W. (1987b). Do positively and negatively worded items measure substantively different components of self-concept?: A construct validity approach. (In Review).

Marsh, H. W. (1987c). The hierarchical structure of self-concept: An application of hierarchical confirmatory factor analysis. Journal of

Educational Measurement, xxx-xxx.

Marsh, H. W. (in press). Multitrait-multimethod analyses. In J. P. Keeves (Ed.), Educational research methodology, measurement and evaluation: An international handbook. Oxford, Pergamon Press.

Marsh, H. W., Balla, J. R., & McDonald, R. P. (1986). Goodness-of-fit indices in confirmatory factor analysis: The effect of sample size. (In Review).

Marsh, H. W., Barnes, J. & Hocevar, D. (1985). Self-other agreement on multidimensional self-concept ratings: Factor analysis & multitrait-multimethod analysis. Journal of Personality and Social Psychology, 49, 1360-1377.

Marsh, H. W., Byrne, B. M., & Shavelson, R. J. (1987). The hierarchical structure of academic self-concept: The Marsh/Shavelson model. (In review).

Marsh, H. W., & Hocevar, D. (1983). Confirmatory factor analysis of multitrait-multimethod matrices. Journal of Educational Measurement, 20, 231-248.

Marsh, H. W. & Hocevar, D. (1985). The application of confirmatory factor analysis to the study of self-concept: First and higher order factor structures and their invariance across age groups. Psychological Bulletin, 97, 562-582.

Marsh, H. W., & O'Niell, R. (1984). Self Description Questionnaire III (SDQ III): The construct validity of multidimensional self-concept ratings by late-adolescents. Journal of Educational Measurement, 21, 153-174.

Marsh, H. W., Richards, G., & Barnes, J. (1986a). Multidimensional self-concepts: A long term followup of the effect of participation in an Outward Bound program. Personality and Social Psychology Bulletin, 12, 475-492.

Marsh, H. W., Richards, G., & Barnes, J. (1986b). Multidimensional self-concepts: The effect of participation in an Outward Bound program. Journal of Personality and Social Psychology, 50, 195-204.

Marsh, H. W., & Shavelson, R. J. (1985). Self-concept: Its multifaceted, hierarchical structure. Educational Psychologist, 20, 107-125.

Marsh, H. W. & Smith, I. D. (1981). Multitrait-multimethod analyses of two self-concept instruments. Journal of educational psychology, 74, 430-440.

Marx, R. W., & Winne, P. H. (1978). Construct interpretations of three self-concept inventories. American Educational Research Journal, 15, 99-108.

McDonald, R. P. (1985). Factor analysis and related methods. Hillsdale, NJ: Lawrence Erlbaum.

Pedhauzur, E. J. (1982). Multiple regression in behavioral research (2nd ed.). New York: Holt, Rinehart and Winston.

Pound, R. E., Hansen, J.C., & Putnam, B. A. (1977). An empirical analysis

of the Tennessee Self Concept Scale. Educational and Psychological Measurement, 37, 545-551.

Rentz, R. R., & White, W. F. (1967). Factors of self perception in the Tennessee Self Concept Scale. Perceptual and Motor Skills, 24, 118.

Roffe, M. W. (1981). The factorial structure of the Tennessee Self Concept Scale. Psychological Reports, 48, 455-462.

Rosenberg, M. (1979). Conceiving the self. New York: Basic Books.

Rushton, J. P., Brainerd, C. J., & Pressley, M. (1983). Behavioral development and construct validity: The principle of aggregation. Psychological Bulletin, 94, 18-38.

Shavelson, R. J., Hubner, J. J. & Stanton, G. C. (1976). Validation of construct interpretations. Review of Educational Research, 46, 407-441.

Soares, L. M., & Soares, A. T. (July, 1982). Convergence and discrimination in academic self-concepts. Paper presented at the 20th Congress of the International Association of Applied Psychology, Edinburgh, Scotland.

Stanley, J. C. (1961). Analysis of unreplicated three way classifications with application to rater bias and trait independence. Psychometrika, 26, 655-678.

Tzeng, O.C.S., Maxey, W. A., Fotier, R., & Landis, D. (1985). Construct validitiol of the Tennessee Self Concept Scale. Educational and Psychological Measurement, 45, 63-78.

Vacchiano, R. B., & Strauss, P. S. (1968). The construct validity of the Tennessee Self Concept Scale. Journal of Clinical Psychology, 24, 323-326.

Wells, L. E., & Marwell, G. (1976). Self-esteem: Its conceptualization and measurement. Beverly Hills, Calif.: Sage Publications.

Widaman, K. F. (1985). Hierarchically nested covariance structure models for multitrait-multimethod data. Applied Psychological Measurement, 9, 1-26.

Wylie, R. C. (1974). The self-concept: Revised Edition (Vol. 1). A Review of methodological considerations and measuring instruments. Lincoln: University of Nebraska Press.

Wylie, R. C. (1979). The self-concept (Vol. 1) Lincoln: University of Nebraska Press.

Table 1

Exploratory Factor Analysis of Responses to 90 TSCS Items

Subscales and Paraphrased Items	Empirically Derived Factors 1	2	3	4	5	6	7	8	9
Physical Subscale									
1 Have healthy body	-05	-14	09	-23	59*	04	02	-01	07
2 Like to look neat	02	-10	17	15	13	19	-38*	20	01
3 I'm an attractive person	19	06	02	06	39*	07	-17	05	-04
4 Full of aches & pains	-01	13	01	-21	29*	15	-01	22	-11
5 Consider myself sloppy	04	00	06	-02	31*	09	-16	-09	14
6 I'm a sick person	-02	00	12	-31*	29	14	02	06	05
7 Neither too fat or thin	01	-08	-01	07	65*	00	02	-03	02
8 Neither too tall or short	00	01	01	06	31*	-01	15	17	-02
9 Like my looks	06	-01	09	21	69*	-09	02	08	-05
10 Don't feel well as should	00	11	02	04	29*	01	05	08	24
11 Like to change body	-03	09	01	21	57*	-25	05	11	08
12 Should have more sex appeal	17	33*	00	04	30*	-21	-12	07	-01
13 Take care physically	-02	-13	14	-03	58*	09	-03	-10	16
14 Feel good mostly	20	09	20	09	28*	16	11	16	-02
15 Careful about my appearance	18	11	23	06	32*	15	-21	-26	-01
16 Do poorly in sports/games	10	-01	-11	-06	44*	08	-04	-15	06
17 Act "all thumbs"	-06	23	16	12	22	10	-05	10	32*
18 I'm a poor sleeper	10	11	07	06	04	09	02	24*	-02
Moral-ethical Self Subscale									
19 I am decent person	05	03	-01	-02	08	36*	-15	19	06
20 I am religious person	02	-13	00	-03	00	-08	-61*	27	10
21 I am honest person	-12	06	06	03	08	38*	18	12	12
22 I am moral failure	12	09	00	-09	22	32*	06	06	02
23 I am a bad person	-01	06	07	04	14	41*	-10	21	07
24 I am morally weak	09	03	01	00	11	52*	09	04	05
25 Satisfactory moral behavior	05	16	12	23	-05	42*	-04	02	11
26 Religious as I want to be	01	-11	10	16	00	08	68*	-04	05
27 Satisfied relation to God	-02	-11	01	15	12	02	32*	31*	05
28 Wish more trustworthy	06	51*	08	10	03	24	09	-07	07
29 Ought to go to church more	-01	06	-05	-11	04	-08	64*	11	08
30 Shouldn't tell so many lies	-08	47*	12	-02	-05	17	03	01	10
31 True to religion everyday	02	-08	01	03	-01	03	02	41*	08
32 Do right most times	01	04	-01	22	-04	35*	05	06	19
33 I change when do wrong	05	-12	10	04	-04	15	10	31*	03
34 Use unfair means	-20	30*	03	-08	08	19	12	37*	00
35 Sometimes do bad things	-18	30*	08	-12	-04	13	04	08	30*
36 Trouble doing right things	-02	16	02	07	00	45*	04	11	14
Personal Self Subscale									
37 I'm a cheerful person	51*	-12	09	06	05	09	02	23	05
38 Have lots of self-control	13	-05	05	06	17	23	08	-13	32*
39 I'm calm/easy-going person	27*	-21	11	06	12	04	01	18	15
40 I'm a hateful person	27*	17	09	04	11	18	04	23	-01
41 I'm a nobody	27*	14	02	03	18	13	00	22	-05
42 I'm losing my mind	07	19	14	-27*	04	27*	-06	-06	14
43 Satisfied to be what I am	15	02	00	34*	23	10	17	-01	11
44 I'm as smart as I want	-08	25	06	44	08	17	10	05	-04
45 I'm as nice as I should be	11	08	21	40*	08	26	-01	05	-08
46 Not person I like to be	20	23	05	23	32*	11	04	00	08
47 I despise myself	19	27*	-03	02	20	18	03	18	06
48 Wish didn't give up easily	00	25	05	07	25	-06	09	-01	35*
49 Can take care of self	20	-02	-08	14	04	20	04	06	30*
50 Solve my problems easily	13	-07	-04	23	10	19	03	-05	41*
51 Take blame without get mad	05	-08	12	15	-02	18	-10	11	31*
52 Change my mind a lot	07	10	-07	-05	03	08	07	08	38*
53 Do things without thinking	01	14	02	-11	03	03	-09	-02	40*
54 Run away from my problems	13	-05	08	-05	10	12	01	04	33*

Family Self Subscale									
55 Family help when in trouble	05	12	57*	-18	08	00	04	04	-11
56 Important to family/friends	20	08	26*	-18	06	19	-05	-03	-01
57 Member of happy family	-02	-04	75*	-01	19	-04	-03	01	-05
58 I'm not loved by family	13	14	56*	-19	00	00	05	12	-13
59 Friends no confidence in me	14	04	17*	-17*	15	05	-04	-02	09
60 Family doesn't trust me	11	09	59*	-16	00	10	05	10	09
61 Satisfied family relations	-06	03	74*	17	07	-02	-02	-03	05
62 Treat parents as I should	-05	03	43*	36*	02	-03	03	26	11
63 Understand family as should	-10	08	49*	42*	07	03	-06	-04	15
64 Too sensitive to family	-07	11	05	11	09	-08	07	02	48*
65 Should trust family more	-03	30*	36*	07	06	-13	04	03	22
66 Should love family more	-06	34*	27	21	-03	-07	08	10	24
67 Play fair family/friends	12	-09	33*	03	-07	33*	01	12	-04
68 Do share of work at home	15	-03	10	06	06	-12	05	07	27*
69 Take interest in family	14	-10	63*	02	01	03	-06	10	04
70 Quarrel with family	-03	02	37*	01	-03	-08	-05	10	39*
71 Give in to parents	17	14	-35*	-21	03	-06	08	-07	12
72 Don't act as family wants	02	15	54*	07	-15	01	-04	-08	32*
Social Self Subscale									
73 I'm friendly person	51*	-05	03	-07	03	19	-04	10	-03
74 I'm popular with women	46*	-04	-01	00	17	-02	-08	-12	09
75 I'm popular with men	43*	-13	07	-03	09	02	-02	-07	13
76 I'm mad at whole world	18*	09	13	-15	04	18*	13	00	05
77 Not interested in others	26*	02	-02	24	-03	09	-09	07	03
78 Hard to be friendly with	58*	10	07	-01	-04	09	08	15	04
79 I'm as sociable as I want	36*	11	14	29	06	-04	04	-14	-05
80 Satisfied with treat others	14	07	15	27	05	31*	05	-19	13
81 Please others, not overdone	24	-09	04	06	06	29	11	-08	-03
82 Should be more polite	08	57*	08	07	-11	04	09	-08	11
83 I'm no good socially	51*	12	03	-12	11	-01	04	13	-14
84 Ought get along better	39*	64*	05	20	-07	-09	10	-08	01
85 I understand other's view	20	-17	07	10	-14	21	04	38	09
86 See good points in all	34*	-04	-04	20	-04	-04	-19	18	06
87 Get along well with others	52*	02	07	04	00	24	-08	02	01
88 Not at ease with others	64*	17	00	-02	-02	-16	-02	05	17
89 I do not forgive easily	22	11	03	02	03	-13	19	33*	09
90 Hard to talk to strangers	59*	07	-02	-01	04	-09	-04	14	06

Correlations Among Factors

Social	100								
Negative-items	10	100							
Family	22	18	100						
Satisfaction	04	-05	-10	100					
Physical	32	15	21	06	100				
Moral (good person)	27	10	27	03	25	100			
Bipolar Moral (religion)	-03	10	-01	08	-01	02	100		
Moral (religion)	13	09	13	00	14	18	01	100	
Personal (identity/behavior)	24	27	21	07	25	25	02	15	100

Note. The exploratory factor analysis was conduct with SPSS-x (SPSS, 1986) using a Kaiser normalization, principal factoring, and a oblimin rotation with delta = 0. A total of 26 eigenvalues were greater than 1.0. Within each of the 5 subscales of 18 items, the three internal frames of reference (identity, satisfaction, behavior) are represented by the first six, second 6 and third six items. Within each subscale of these sets of 6 items, the first three are positively scored items and the second three are negatively scored items. For present purposes, negatively scored items have been reversed so that higher scores always reflect a more positive self-concept. Factor labels used in factor correlation matrix are based on a subjective interpretation of the derived factors. All coefficients are presented without decimal points.

* indicates the highest factor loading for each item and factor loadings greater than .30.

Table 2

Exploratory Factor Analysis of Responses to 30 TSCS Subscales

Subscales		Empirically Derived Factors						
		1	2	3	4	5	6	7
Positively Worded Subscales								
1 Physical	Identity	05	17	05	18	58*	05	-20
2 Physical	Satisfaction	-02	-03	11	02	67*	-05	-05
3 Physical	Behavior	14	03	09	24	55*	-01	-18
4 Moral	Identity	06	62*	01	06	07	10	07
5 Moral	Satisfaction	-01	-27	52*	04	01	08	-03
6 Moral	Behavior	05	20	46*	03	-07	17	02
7 Personal	Identity	43*	10	-26	-10	18	02	-06
8 Personal	Satisfaction	04	-09	53*	07	19	-14	05
9 Personal	Behavior	22	13	38*	07	11	-02	13
10 Family	Identity	03	02	-12	78*	07	10	-01
11 Family	Satisfaction	-16	09	29	68*	06	-26	20
12 Family	Behavior	17	07	16	47*	02	-01	00
13 Social	Identity	69*	00	-03	-04	13	-04	-11
14 Social	Satisfaction	33*	10	27	16	13	20	01
15 Social	Behavior	56*	19	16	00	-06	02	00
Negatively Worded Subscales								
16 Physical	Identity	03	05	10	09	43*	34*	-01
17 Physical	Satisfaction	02	-02	-02	-05	56*	-04	30*
18 Physical	Behavior	11	-04	00	09	37*	15	22
19 Moral	Identity	08	03	35*	12	18	45*	-14
20 Moral	Satisfaction	-01	-45*	22	04	02	30*	33*
21 Moral	Behavior	-06	12	14	07	02	37*	34*
22 Personal	Identity	28	03	09	17	07	39*	10
23 Personal	Satisfaction	11	-11	-19	-01	44*	05	35*
24 Personal	Behavior	13	14	12	02	11	14	34*
25 Family	Identity	14	-04	09	53*	03	18	09
26 Family	Satisfaction	-07	-06	08	30*	05	-04	58*
27 Family	Behavior	16	-02	-10	26	-04	05	41*
28 Social	Identity	60*	-14	-05	12	-05	21	-03
29 Social	Satisfaction	37*	-28	01	03	06	04	39*
30 Social	Behavior	57*	08	-05	-02	08	-04	21

Correlations Among Factors							
Social	100						
Bipolar Moral	12	100					
Moral/Personal	29	00	100				
Family	36	04	29	100			
Physical	43	10	30	37	100		
Moral/Personal	25	07	10	20	19	100	
Negative Items	23	08	21	24	21	23	100

Note. The exploratory factor analysis was conduct with SPSS-x (SPSS, 1986) using a Kaiser normalization, principal factoring, and a oblimin rotation with delta = 0. A total of 7 eigenvalues were greater than 1.0. For present purposes, negatively scored items have been reversed so that higher scores always reflect a more positive self-concept. Factor labels used in factor correlation matrix are based on a subjective interpretation of the derived factors. All coefficients are presented without decimal points. (See Table 2 for wording of the items)

* indicates the highest factor loading for each item and factor loadings greater than .30.

Table 3

Exploratory Factor Analysis of Responses to 15 TSCS Subscales

Subscales		Empirically Derived Factors				
		1	2	3	4	5
1 Physical	Identity	02	-26	67*	10	13
2 Physical	Satisfaction	-02	18	73*	-01	-05
3 Physical	Behavior	14	02	55*	08	07
4 Moral	Identity	06	-19	13	-03	71*
5 Moral	Satisfaction	03	47*	00	17	07
6 Moral	Behavior	-02	17	-05	12	56*
7 Personal	Identity	40*	06	13	11	33*
8 Personal	Satisfaction	08	58*	38*	00	14
9 Personal	Behavior	18	23	08	04	37*
10 Family	Identity	11	-11	12	61*	01
11 Family	Satisfaction	-20	25	06	75*	04
12 Family	Behavior	17	-05	-05	70*	05
13 Social	Identity	81*	-05	03	05	-04
14 Social	Satisfaction	44*	39*	08	14	-07
15 Social	Behavior	60*	04	02	00	15
Correlations Among Factors						
Social		100				
Satisfaction		17	100			
Physical		49	20	100		
Family		46	38	44	100	
Moral/Personal		46	18	49	48	100

Note. The exploratory factor analysis was conduct with SPSS-x (SPSS, 1986) using a Kaiser normalization, principal factoring, and a oblimin rotation with delta = 0. A total of 5 eigenvalues were greater than 1.0. For present purposes, negatively scored items have been reversed so that higher scores always reflect a more positive self-concept, and then corresponding positively and negatively worded items were summed to form the 15 subscale scores. Factor labels used in factor correlation matrix are based on a subjective interpretation of the derived factors. All coefficients are presented without decimal points. (See Table 2 for wording of the items)

* indicates the highest factor loading for each item and factor loadings greater than .30.

Table 4

Confirmatory Factor Analysis of Responses to 30 TSCS Subscales

TSCS Subscales	A Priori Factors Representing										
	EXT Facet					INT Facet			PN Facet		Error/
	1 Phys	2 Mor	3 Pers	4 Soc	5 Fam	6 Iden	7 Sat	8 Beh	9 Pos	10 Neg	Uniqueness
Positively Worded Subscales											
1 Physical Identity	59*	0	0	0	0	36*	0	0	07	0	53*
2 Moral Identity	0	72*	0	0	0	39*	0	0	36*	0	91*
3 Personal Identity	0	0	51*	0	0	52*	0	0	13	0	45*
4 Family Identity	0	0	0	62*	0	48*	0	0	-12	0	41*
5 Social Identity	0	0	0	0	63*	37*	0	0	20*	0	48*
6 Physical Satisfact	55*	0	0	0	0	0	41*	0	07	0	57*
7 Moral Satisfact	0	-35*	0	0	0	0	50*	0	05	0	78*
8 Personal Satisfact	0	0	22*	0	0	0	63*	0	-10	0	66*
9 Family Satisfact	0	0	0	56*	0	0	61*	0	-10	0	35*
10 Social Satisfact	0	07	0	0	47*	0	51*	0	-21*	0	64*
11 Physical Behavior	65*	0	0	0	0	0	0	50*	-16*	0	37*
12 Moral Behavior	0	-01	0	0	0	0	0	53*	17	0	74*
13 Personal Behavior	0	0	32*	0	0	0	0	46*	14	0	66*
14 Family Behavior	0	0	0	44*	0	0	0	51*	-01	0	58*
15 Social Behavior	0	0	0	0	44*	0	0	40*	30*	0	64*
Negatively Worded Subscales											
16 Physical Identity	36*	0	0	0	0	40*	0	0	0	24*	64*
17 Moral Identity	0	-08	0	0	0	76*	0	0	0	09	42*
18 Personal Identity	0	0	20*	0	0	62*	0	0	0	35*	44*
19 Family Identity	0	0	0	48*	0	44*	0	0	0	22*	52*
20 Social Identity	0	0	0	0	45*	39*	0	0	0	23*	57*
21 Physical Satisfact	44*	0	0	0	0	0	36*	0	0	33*	63*
22 Moral Satisfact	0	-37*	0	0	0	0	37*	0	0	51*	56*
23 Personal Satisfact	0	0	49*	0	0	0	53*	0	0	43*	38*
24 Family Satisfact	0	0	0	36*	0	0	42*	0	0	45*	50*
25 Social Satisfact	0	0	0	0	41*	0	36*	0	0	52*	48*
26 Physical Behavior	33*	0	0	0	0	0	0	31*	0	33*	69*
27 Moral Behavior	0	09	0	0	0	0	0	46*	0	42*	63*
28 Personal Behavior	0	0	23*	0	0	0	0	40*	0	34*	65*
29 Family Behavior	0	0	0	34*	0	0	0	25*	0	38*	67*
30 Social Behavior	0	0	0	0	50*	0	0	33*	0	25*	59*
Factor Correlations											
Phys	1										
Mor	11	1									
Pers	64*	-07	1								
Soc	34*	05	36*	1							
Fam	46*	-03	68*	33*	1						
Iden	0	0	0	0	0	1					
Sat	0	0	0	0	0	62*	1				
Beh	0	0	0	0	0	83*	75*	1			
Pos	0	0	0	0	0	0	0	0	1		
Neg	0	0	0	0	0	0	0	0	08	1	

Note. The confirmatory factor analysis was conduct with LISREL V (Joreskog & Sorbom, 1981). All parameters with values of 0 or 1 were fixed whereas other parameters were freely estimated. For all parameter estimates statistical significance was tested with the standard error of the estimate provided by LISREL.

* $p < .05$.

Table 5

Goodness of Fit Summaries for Confirmatory Factor Analysis Models Posited to Fit Responses to 30 Tennesse Self Concept Scales [N=343]

Model	Description	X2	df	X2/df	TLI	BBI
0	Null Model	3855	435	8.86	---	---
1	1 General factor only	1499	405	3.70	.656	.611
2	2 PN factors only	1377	404	3.41	.694	.643
3	3 INT factors only	1360	402	3.38	.697	.647
4	5 EXT factors only	1173	395	2.97	.750	.696
5	2 PN and 3 INT factors	1065	371	2.87	.762	.724
6	2 PN and 5 EXT factors	710	364	1.95	.879	.816
7	3 INT and 5 EXT factors	713	362	1.97	.877	.815
8	2PN, 3 INT and 5 EXT factors	507	331	1.53	.932	.868

Note. TLI = Tucker-Lewis Index. BBI = Bentler-Bonett Index. PN = facet of positively or negatively worded items. EXT = facet of physical, social, moral, family, and personal scales. INT = facet of identity, satisfaction, and behavior subscales. The null model posits 30 uncorrelated single-item factors and is used to calculate the TLI and BBI. Model 1 posits a single factor. The remaining models (2 - 8) posit factors represented in PN, EXT, and INT facets used in the design of the TSCS. Table 4 contains the parameter estimates for Model 8 and illustrate the definition of all the factors posited in Models 2 - 8.

Table 6

Variance in Responses to the Tennesse Self Cconcept Scales Attributable To Its Various Facets [N=343]

Source	df	SS	MS	Variance Component
Subjects (S)	342	1140.2	3.334**	.104
S x Positive/Negative (PN)	342	217.4	.636**	.029
S x External (Ext)	1368	688.1	.503**	.050
S x Internal (Int)	684	357.7	.523	.032
S x PN x EXT	1368	333.2	.244	.013
S x PN x INT	684	195.3	.286	.016
S x Ext x Int	2736	683.7	.250	.023
S x PN x EXT x INT (error)	2736	557.1	.204	.204

Note. Results are based on a S (343) x PN (2) x Ext (5) x INT (3) Anova. PN, EXT, and INT refer to differences due to positively and negatively worded items, the internal scales of the TSCS, and the external scales of the TSCS respectively. For this 4-factor unreplicated design the fourth-order interaction term is assumed to represent random error and used to test the statistical significance of all other effects. The computation of variance components is based on Kavenagh, et al. (1971).

** $p < .01$.

Table 7

Correlations Between Scores From the Self Description Questionnaire (SDQ) III and From Tenneesse Self Cconcept Scales (TSCS) [N=343]

	SDQ III Scores[a]														
TSCS Scores	Prt	Ssx	Osx	Phy	Apr	Hst	Spt	Gen	Emt	Prb	Acd	Mth	Vrb	Tot	rxx[b]
TSCS Total	51	52	37	40	56	47	05	69	57	24	37	16	40	71	93
External Scales															
Family	68*	33	16	19	32	39	01	48	39	14	28	10	24	48	84
Social	33	61*	59*	32	40	31	07	55	48	25	25	01	35	59	81
Physical	33	43	28	53*	71*	29	10	60	44	30	29	14	27	63	81
Moral	25	23	10	19	30	53*	03*	41	36	28	30	17	33	45	69
Personal	38	47	34	33	50	38	01	71*	60*	39	36	21	39	67	82
Internal Scales															
Identity	51	52	42	41	52	44	25	65	48	30	36	12	37	72	86
Satisfaction	42	41	25	26	51	32	-17	59	48	29	26	16	28	51	87
Behavior	43	48	33	39	45	51	14	60	56	31	38	13	41	67	82
Ext/Int scales															
Fam/Id	65*	36	21	27	31	33	08	45	28	11	25	08	21	48	75
Fam/Sat	54*	19	05	08	24	28	-08	37	34	12	19	08	16	32	74
Fam/Beh	52*	29	17	16	25	37	06	37	35	13	30	10	25	44	48
Soc/Id	25	53*	53*	34	37	24	10	45	36	24	24	05	30	53	65
Soc/Sat	32	48*	41*	22	29	22	-14	46	37	14	15	00	24	39	63
Soc/Beh	21	49*	49*	23	30	29	23	44	43	23	23	-03	31	52	69
Phy/Id	30	32	22	39*	51*	27	19	44	28	21	23	10	20	49	58
Phy/Sat	19	31	25	34*	69*	18	04	51	36	26	21	12	21	48	68
Phy/Beh	34	43	23	60*	53*	28	05	51	45	24	27	13	27	57	58
Mor/Id	25	23	24	21	32	45*	51*	44	27	29	31	08	34	55	51
Mor/Sat	11	16	04	09	16	23*	-38*	23	23	22	15	18	16	17	60
Mor/Beh	21	14	-02	12	20	50*	08*	25	29	14	24	10	26	32	53
Per/Id	33	45	36	30	42	36	10	60*	58*	29	32	14	36	61	67
Per/Sat	32	39	24	24	49	25	-09	61*	46*	32	27	21	27	51	69
Per/Beh	26	33	29	28	29	35	05	54*	46*	37	32	18	36	54	64
Physical Factors[c]															
Fit/healthy body	25	29	14	66*	55	16	08	43	30	22	20	09	18	48	
Neat appearance	32	30	26	25	41	20	15	36	15	14	14	08	14	39	
Attractiveness	20	36	29	36	76*	17	05	55	35	29	22	14	20	52	
Sickness	27	35	16	41	44	33	06	48	47	26	31	14	32	53	
Moral Factors[d]															
Honesty	31	28	16	23	30	54*	00	44	36	28	30	17	33	47	
Bipolar Religion	06	-07	05	-06	01	08	76*	00	-07	-06	02	-10	02	15	
Religion	13	14	08	13	24	25	24*	31	23	21	21	07	22	34	
rxx[e]	90	90	92	92	88	77	96	90	90	84	93	86	94	96	

Note. All correlations, presented without decimal points, greater than .12 are statistically significant ($p < .05$, two-tailed).

[a] The 13 SDQIII scores are: Parent Relations, Same Sex Relations, Opposite Sex Relations, Physical Abilities, Physical Appearance, Honesty/trustworthiness, Spiritual Values/Religion, General Esteem, Emotional Stability, Problem Solving, Academic, Math, and Verbal. [b] Coefficient alpha estimates of reliability for all TSCS scale scores. [c] Empirically derived factors scores from factor analyses of the 18 TSCS Physical items and of the 18 TSCS Moral items. [d] Coefficient alpha estimates of reliability for SDQIII scale scores.

* Correlations between TSCS and SDQIII scales hypothesized to be matching (i.e., convergent validities).

Table 8

Correlations Between External Observer Ratings and Self-response Ratings to the Self Description Questionnaire (SDQ) III and Tennesse Self Cconcept Scales (TSCS) [N=280]

	External Observer Ratings[a]												
	Prt	Ssx	Osx	Phy	Apr	Hst	Spt	Emt	Prb	Acd	Mth	Vrb	Tot
TSCS Total	18	20	16	20	21	08	07	11	19	17	16	26	28
TSCS External Scales													
Family	24*	18	09	14	09	05	04	06	12	11	15	21	21
Social	15	26*	29*	13	24	03	07	06	10	12	05	25	25
Physical	10	15	08	31*	22*	03	07	07	21	14	15	13	24
Moral	07	04	02	01	08	16*	05*	08	15	18	16	22	17
Personal	12	19	16	18	22	11	05	18*	22	16	15	25	28
TSCS Internal Scales													
Identity	23	20	20	17	24	08	19	11	17	15	14	22	31
Satisfaction	12	22	14	18	19	08	-09	12	21	14	16	25	23
Behavior	13	13	10	17	14	09	13	07	12	16	16	26	28
TSCS Ext/Int scales													
Fam/Id	31*	19	14	16	16	09	09	12	09	15	17	17	26
Fam/Sat	17*	10	02	11	04	03	-04	02	13	05	10	20	19
Fam/Beh	10*	16	08	05	05	01	09	00	03	05	09	13	13
Soc/Id	10	21*	31*	14	26	-04	06	06	10	09	07	18	22
Soc/Sat	11	25*	23*	14	20	06	-09	07	10	12	04	21	19
Soc/Beh	15	17*	18*	03	11	05	21	00	05	09	00	22	19
Phy/Id	08	08	03	17*	14*	02	14	02	15	09	11	09	17
Phy/Sat	06	15	11	26*	21*	04	02	09	20	14	10	20	13
Phy/Beh	05	06	10	21*	19*	06	09	13	17	16	11	10	19
Mor/Id	13	01	06	03	13	09*	29*	03	11	09	06	11	18
Mor/Sat	-02	09	02	00	07	06*	-17*	08	14	07	13	15	07
Mor/Beh	05	00	-02	-01	-01	21*	05*	05	07	21	14	19	13
Per/Id	15	20	18	09	18	14	11	15*	17	10	07	22	25
Per/Sat	09	24	15	14	19	09	-05	16*	21	15	15	22	24
Per/Beh	06	06	10	21	19	06	09	13*	17	16	16	18	23
TSCS Physical Factors[c]													
Fit/healthy body	05	02	00	32*	13	-11	-02	03	15	06	08	05	11
Neat appearance	15	15	08	14	20	01	14	09	21	14	15	16	24
Attractiveness	05	17	13	27	26*	04	03	06	22	15	16	14	24
Sickness	09	05	-01	19	04	09	05	06	08	09	08	08	13
TSCS Moral Factors[d]													
Honesty	08	06	07	07	15	08*	00	07	11	12	14	19	15
Bipolar Religion	09	-08	-01	-09	-05	06	40*	-07	-05	-01	-05	-05	04
Religion	09	01	-01	-01	06	07	19*	05	17	12	07	14	14
SDQIII Scales													
Parents	37*	16	15	16	13	10	09	10	07	11	15	13	25
Same Sex Peers	15	26*	26	21	21	06	-01	14	08	11	10	15	24
Opp Sex Peer	08	24	45*	12	32	-03	05	-01	07	04	-01	10	20
Phys Ability	11	11	13	49*	18	-08	-03	19	11	02	08	05	20
Phys Appear	07	16	21	30	32*	01	04	06	25	16	16	18	28
Honesty/Trust	22	07	03	-04	04	26*	14	18	07	22	15	21	21
Spiritual/Relig	14	-01	02	-12	-05	14	57*	-01	04	06	-01	01	15
Emotional Stabil	05	19	16	15	12	11	08	17*	21	13	17	28	26
Problem Solving	00	00	09	08	15	-01	01	07	28*	21	24	21	19
Academic	22	11	13	07	17	21	09	12	30	44*	41	37	38
Math	11	04	03	10	15	13	01	13	28	27	42*	23	27
Verbal	08	04	14	02	17	11	07	07	22	26	21	31*	25
General Esteem	13	23	24	24	30	07	14	13	27	20	22	25	35
Total Score	24	21	28	24	30	15	21	18	32	31	32	34	45
External Rater Agreement[b]													
r12	35	23	39	46	23	06	33	15	24	35	33	28	28
rxx	52	38	56	63	37	11	50	27	39	52	50	43	44

Note. All correlations, presented without decimal points, greater than .12 are statistically significant ($p < .05$, two-tailed).

[a] External observer scales correspond to SDQIII scales (see Table 8). [b] r12 is the correlation between two different external observers whereas rxx is the coefficient alpha estimate of the total of the two ratings.